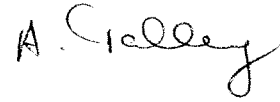


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Grasping Incidents

Introduction

Public Works and Engineering employees serve Houstonians on a daily basis, but unfortunately they themselves can fall victim to injuries while executing their duties. The primary goal of the Department of Public Works & Engineering is to ensure that our employees return home safe every day. To reduce job-related accidents, concerted efforts including training and safety audits have been present leading to a steady decline in workers' compensation claims over the years. However, a proactive approach requires constant vigilance and innovative methods to ensure continued success. One potential outlet is the implementation of a Geographic Information Systems (GIS) study, which focuses on incident locations, to identify trends in available workers' compensation-related data. Building upon the simple information on where an incident takes place, the maps produced can also identify an incident's specific conditions. Complemented by existing ongoing efforts, the study can potentially help provide direction in future safety initiatives.

Background

Founded shortly after the Texas War for Independence by J.K. and A.C. Allen in 1836, the City of Houston currently boasts a population of over 2.14 million. If considered as an independent nation, Houston would rank 30th in economic production in the world. The city's economy covers a broad spectrum of industries ranging from energy to medical research to

international trade. Houston is not only a place for business but a place for learning and living. An excess of forty institutions of higher education operate within the city, and residents can select from over 11,000 restaurants to enjoy. Museums, professional sports, performing arts, and the world's largest rodeo compose the entertainment staples of the city. As Houston continues to progress, the city can justify its claim to be "alive with energy and rich in diversity" while providing "a dynamic mix of imagination, talent, and first-class attractions."¹

For the city to continue operating, the City of Houston Public Works and Engineering Department must plan, build, and maintain the city's infrastructure. Many take for granted the services provided by the department such as clean water, fire hydrants, traffic lights, and city streets. The department's vast scope of responsibilities is matched by the sheer size of its duties. A sample of the work done by the department includes maintaining over 16,000 lane miles of streets, approximately 900,000 street name and traffic control signs, and traffic signals at more than 2,000 intersections. The department also produces and distributes 146 billion gallons of water annually – enough to fill the Astrodome four times with water. Executing these tasks involves a \$1.2 billion annual operating budget and requires approximately 4,000 employees to actually perform the work.²

Injuries unfortunately occur in any workplace, but the risk exposure for Public Works and Engineering employees are inherently greater than other professions. Street workers repairing potholes remain vulnerable to vehicular accidents while electricians expose themselves to the risk of electrocution. Individuals engaging in physical labor predictably face more ailments than those that do not. Many employees practice their profession outdoors; therefore, they face the

¹ City of Houston, "About Houston," City of Houston: The Official Site of Houston, 2008, Accessed 7 July 2008, <<http://www.houstontx.gov/about/houston/index.html>>.

² City of Houston, "Public Works and Engineering," City of Houston: The Official Site of Houston, 2008, Accessed 7 July 2008, <<http://www.publicworks.houstontx.gov/index.html>>.

dangers associated with nature including poison ivy, wildlife, and the sweltering Houston heat. In the presence of such conditions, the department engages in due diligence to reduce risks to protect its employees.

The personal costs inflicted by an incident may inhibit employees from practicing their profession, and personal well-being is an explicit concern of the city. The workers' compensation program ultimately aims to establish "a program to manage the medically safe return of a recovering employee to productive work" with the city holding the responsibility to help employees' recovery by providing salary continuation, medical payments, and light-duty work.³ However, the financial costs associated with workers' compensation claims at a national level are immense, costing \$232 billion annually. Costs will only increase as general medical costs continue to spike upward. Medical treatments tend to be more complex, hence more expensive, than before. From 1996 to 2002, the average price of treatment for all injuries nationwide increased by 19%. Emergency services jumped 67% while the price of drugs, supplies, and durable medical equipment increased by 42%. The severity of injuries has also increased since the mid-1990s.⁴

Controlling financial costs linger as an issue especially when resources become scarcer. A potential means of balancing budgets is to continue efforts to reduce injuries. Such investments in preventive measures benefit all parties involved. Increased safety helps induce higher morale and productivity even while improving the city's reputation as a place to work.⁵

³ Baughn, Bob, "The Elements of an Effective Safety and Health Plan," SHRM White Paper, SHRM Information Center, June 2002, Accessed 9 July 2008, <http://www.shrm.org/hrresources/whitepapers_published/1CMS_00166.asp>.

⁴ Restrepo, Tanya, Harry Shuford, and Nathan Beaven, "Measuring the Factors Driving Medical Severity: Price, Utilization, Mix," NCCI Researching Brief, NCCI Holdings Inc. (Jan. 2007): 9, 1.

⁵ Baughn.

The public will experience improved service delivery. Employees will constantly learn new skills, as new methods to do their job safer emerge.⁶

Review of the available literature reveals methods used by various entities to reduce potential workplace injuries. According to Bob Baughn in “The Elements of an Effective Safety and Health Plan” and Claire Reiss in “How Federal Occupational Safety and Health Regulations Can Help Local Governments Provide a Safer Public Workplace,” the Occupational Safety and Health Act promotes engineering controls as the most effective means to reduce hazards. Lowering workbenches, installing safety switches, or adding lifting mechanisms can help preclude accidents. Employees will also face less danger if their exposure to the hazards is eliminated, and employers can develop new work practices to help alleviate the risk of injuries. If employees must engage in dangerous environments, administrative controls can at least limit their exposure. Personal protective equipment acts as a critical line of defense for employees.⁷ The financial and human cost incurred by injuries dwarfs the price of equipment such as goggles, hard hats, and gloves. Employers can further protect themselves by ensuring that they receive the necessary training in operating machinery and applying safety precautions.

To avoid relying on anecdotal evidence, managers depend on a series of measures, or metrics, to determine performance levels and establish goals. Metrics move beyond calculating the total number of incidents by tabulating potential indicators that lead to a given outcome. With a proper set of metrics, analysts can address the core issues concerning workers’ compensation.⁸ In regards to workers’ compensation cases, two different angles have emerged with the same focus of attempting to achieve the program’s main objectives. The first

⁶ Borgsdorf, Del and Dan Pliszka, “Manage Your Risk or Risk Your Management,” Public Management (Dec. 2002): 10.

⁷ Baughn; Reiss, Claire, “How Federal Occupational Safety and Health Regulations Can Help Local Governments Provide a Safer Public Workplace,” Safer Public Work Place, PERI Institute, 4.

⁸ Marsh Risk Consulting, “Diagnostics,” Marsh Risk Consulting, Marsh Inc., 2004

perspective involves measuring factors that occur after an accident, including time before a claim is processed, duration of disability, and physician quality.⁹ The locus of this study investigates workers' compensation from a complementary angle: conditions surrounding the incident itself. Examples include demographic information, cause of injury, and environmental conditions. Vehicle-caused incidents can also take measures on mileage of vehicle and traffic flow. Randy Wheeler, founder of Valley Oak Systems, believes concrete information not only allows an organization to know where to concentrate its efforts in alleviating injuries but also serves as a means to convince employees the necessity of such measures.¹⁰ Continual collection and analysis of injury data can aid the evaluation of a safety program's success while permitting the city to take appropriate countermeasures by recognizing emerging trends.

Methodology

The methodology fully intends to fulfill the Texas worker compensation's objectives to "take maximum advantage of technological advances to provide the highest levels of service."¹¹ The first step is to compile a database of all workers' compensation claims in the department entered into the system from April 2006 to May 2008. If necessary, further data can be appended as more information becomes available. Along with the primary variable of location, data from a broad range of factors will be considered including time of day, day of the week, and month of the year as well as demographic information such as gender and age. The study also

⁹ Seltzer, Robert W., "Four Measurements for Driving Down Workers' Compensation Costs," Central Penn Business Journal, (20 Apr. 2007); Pennachio, Frank, "Reduce Workers' Comp Costs with CompScore Metrics," Occupational Hazards, 5 July 2007, Accessed 21 July 2008, <http://www.occupationalhazards.com/News/Article/68473/Reduce_Workers_Comp_Costs_with_CompScore_Metrics.aspx>.

¹⁰ Wheeler, Randy, "Internet Technology Improves Workers' Compensation Results," PERI Symposium, December 2003. Milano, Carol, "Decreasing Danger: Effective Injury Prevention Programs," Risk Management Magazine 54.11 (Nov. 2007): 41.

¹¹ State of Texas, "Labor Code – Chapter 402: Operation and Administration of Workers' Compensation System," Section 402.021.b.9.

requires the collection of data pertaining to the direct source and type of injury. Any patterns discovered can provide the foundation for new initiatives in employee safety.

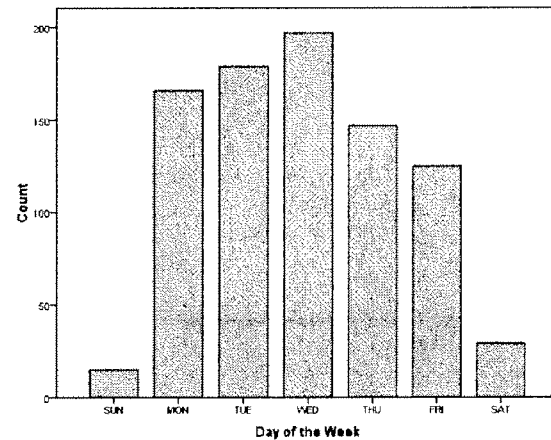
Once the data is appropriately organized, technology developed by the Environmental Systems Research Institute (ESRI) will be used. The California-based consulting firm previously provided assistance in rebuilding the City of Baltimore, Maryland and developing Reston, Virginia. ESRI created a series of software that can geographically manage and map information in a computer-based setting in what is known as geographic information systems (GIS). With over one million users, GIS has spurred enhanced performance for service providers and recipients as a decision support tool.¹² GIS can contribute to the understanding of workers' compensation issues by integrating incident information with geographic locations. By producing maps where high levels of incidents are marked on a map, analysts can identify where incidents are concentrated. The maps produced can also overlay and track additional information of interest, such as incorporating major roadways on the map or factoring in demographic information. As demonstrated by previous studies, understanding the circumstances of an incident, especially its physical environment, can be vital in setting benchmarks and averting future incidents.

To complement the use of GIS, standard statistical analysis will take place with each of the variables collected through the use of the SPSS software package. The software can then produce frequency tables and cross-tabulations to reveal what variables are associated with injuries, if any. Multiple regression models through this software can also estimate the potential impact of a given variable.

¹² Environmental Systems Research Institute, "Company History," ESRI: GIS and Mapping Software, 2008, Accessed 23 July 2008, <<http://esri.com/company/about/history.html>>.

Results

The GIS analysis is currently being conducted; thus, at this time, no results regarding this process can be shared. However, preliminary statistical information based on the workers' compensation data has been completed.

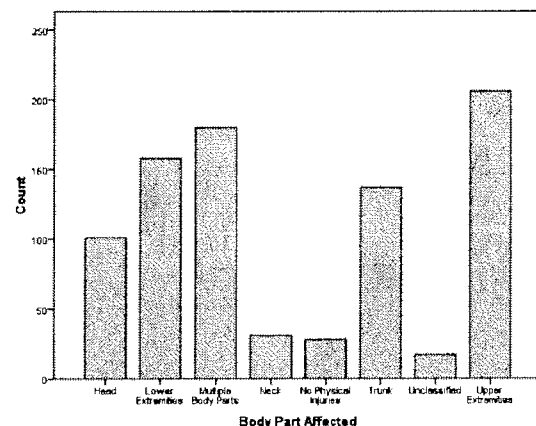


8 a.m. to 5 p.m. (Business Hours for General Population) Including Saturday and Sunday				
		Frequency	Percent	Cumulative Percent
	Occurring Between 8 a.m. and 5 p.m.	113	13.2	13.2
	Outside of 8 a.m. to 5 p.m.	745	86.8	100.0
	Total	858	100.0	

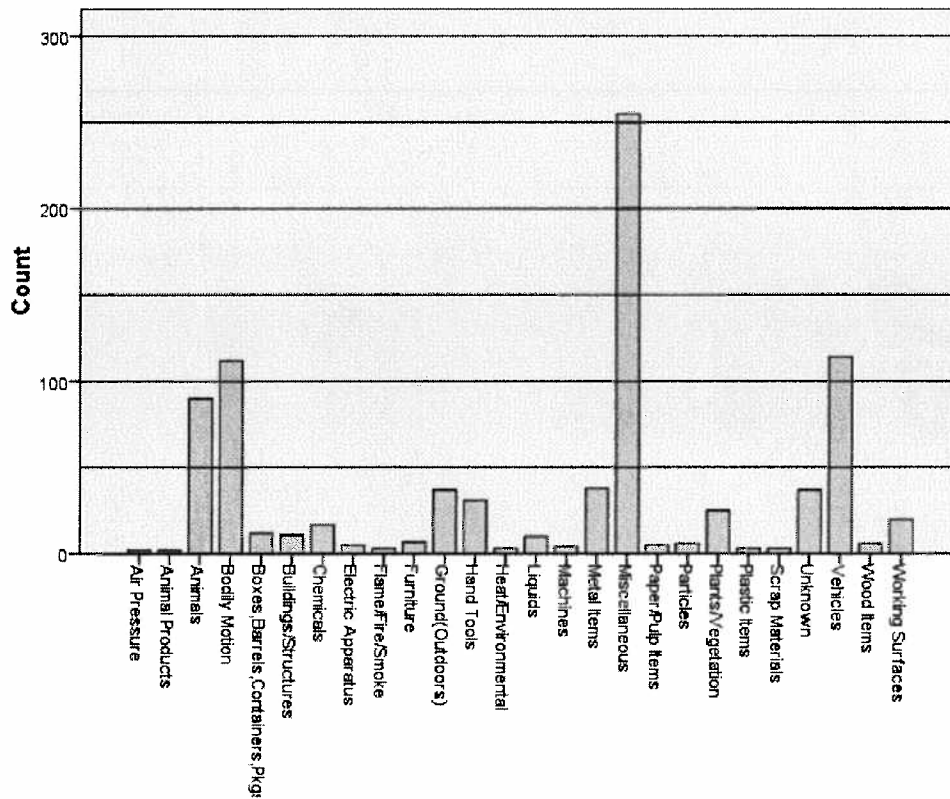
Of the incidents reported, only 5.1% occurred on the weekend. A plurality of the cases occurred on Wednesdays with 23.0%, and Tuesdays had the second largest

percentage at 20.9%. The majority of the incidents occurred during normal business hours as defined as 8 a.m. to 5 p.m. (inclusive of Saturday and Sunday) at 86.8%.

The data available also identified the body part affected by an incident. Approximately 24.0% of the total incidents affected an individual's upper extremities, which includes shoulders, arms, and hands. Twenty-one percent of individuals reporting an incident had injuries affecting multiple parts of their body. Lower extremities, which cover the hips down, were cited in 18.4% of the incidents. The next leading part of the body affected by the injuries is the trunk, which encompasses internal organs and the back, at 18.4%. The head was affected in 11.8% of the cases reported. The analysis also investigated the source of injuries. A catch-all miscellaneous



category captured 29.7% of the cases. The next most frequent cited causes for accidents include vehicles (13.3%), bodily motion (13.1%), and animals (10.5%). For those citing an incident, 23.7% of the individuals missed time from work.



Of the total number of individuals reporting incidents, 12.8% missed two weeks or more from work. A total of over 13,740 work days were lost due to on-the-job incidents from April 2006 to mid-May 2008.

Time Missed		
	Frequency	Percentage
Yes	203	23.7%
No	655	76.3%
Total	858	100.0%

Two weeks or more missed (as of May 2008)		
	Frequency	Percentage
Yes	114	13.2%
No	744	86.8%
Total	858	100.0%

The models developed detail the workers' compensation incidents within the department. Identifying potential trends provides the potential for more targeted approaches for safety

initiatives. The study can also establish the foundation for further research and investigation.

Analysis of incident reports complements other safety-oriented metrics currently in use including safety audits and inspection results.¹³

Conclusions

The primary objective of the Department of Public Works & Engineering is to ensure that the employees return home safe each day. Efforts to reduce job related accidents creates the additional benefit of reducing workers compensation-related costs. These efforts include a retrospective review of the occurrence of previous accidents, as the study here commits itself to the idea that understanding the past can lead to progress in the future.

Initial findings hints at what factors can receive further investigation and suggests new variables in which data can be collected. Further studies can possibly establish a set of variables that can identify the causal reasons behind workers' compensation incidents. With that information, the City of Houston's ability to treat the cause of the issue can only strengthen. Collecting and analyzing information regarding workers' compensation is an ongoing process, and efforts to decrease employee injury cases will continue to improve.

¹³ UK Health and Safety Laboratory, "Literature Review on the Reporting of Workplace Injury Trends," (Crown, 2005), <http://www.hse.gov.uk/research/hsl_pdf/2005/hsl0536.pdf>.